

Claims:

1. A pressure-released brake assembly for restraining a projectile in a launch tube prior to launch and for automatically releasing the projectile at launch, said brake assembly comprising:

a housing configured for fixed attachment to a projectile, said housing defining a plurality of cavities therein, each of said plurality of cavities having a longitudinal axis that extends substantially radially out from the projectile when said housing is attached thereto wherein at least two of said plurality of cavities are angled towards one another;

a brake pad adjoining said housing and having a plurality of holes formed therethrough with each of said plurality of holes aligned with one of said plurality of cavities in said housing;

a pin sized to loosely fit in each of said plurality of holes and at least a portion of each of said plurality of cavities; and

means for positioning each said pin to reside partially in one of said plurality of holes and partially in a correspondingly aligned one of said plurality of cavities wherein said brake pad is coupled to said housing and wherein, when a launch pressure is generated in the launch

24 tube, said launch pressure acts on each said pin via said
25 plurality of holes causing said means for positioning to fail
26 whereby each said pin is driven out of engagement with said
27 brake pad so that said brake pad is uncoupled from said
28 housing.

1 2. A brake assembly as in claim 1 wherein said brake pad is
2 shaped for complementary cooperation with an interior portion
3 of the launch tube.

1 3. A brake assembly as in claim 1 wherein said brake pad is
2 made from a malleable material.

1 4. A brake assembly as in claim 1 wherein each of said
2 plurality of cavities has a first portion and a second
3 portion, said first portion adjoining one of said plurality
4 of holes in said brake pad and sized to receive said pin,
5 said second portion adjoining said first portion and having a
6 diameter smaller than that of said pin wherein, when said pin
7 is driven out of engagement with said brake pad, one end of
8 said pin travels in said first portion until reaching said
9 second portion.

1 5. A brake assembly as in claim 4 wherein each said pin has
2 a counter bore formed therein at said one end thereof.

1 6. A brake assembly as in claim 1 wherein, for each said
2 pin, said means for positioning comprises:

3 a wire passing through said housing and said pin when
4 said pin resides partially in said one of said plurality of
5 holes and partially in said correspondingly aligned one of
6 said plurality of cavities; and

7 a screw threaded into said pin for applying pressure to
8 said wire.

1 7. A brake assembly as in claim 1 further comprising
2 channels formed in said brake pad for directing said launch
3 pressure into each of said plurality of holes.

1 8. A brake assembly as in claim 1 further comprising a
2 lubricant disposed about each said pin, and between said
3 brake pad and said housing.

1 9. A pressure-released brake assembly for restraining a
2 projectile in a launch tube prior to launch and for
3 automatically releasing the projectile at launch, said brake
4 assembly comprising:

5 a housing configured for fixed attachment to the side a
6 projectile, said housing defining first and second cavities
7 therein that lie in a cross-sectional plane of the launch
8 tube, each of said first and second cavities having a
9 longitudinal axis that extends substantially radially out
10 from the projectile when said housing is attached thereto;

11 a brake pad adjoining said housing and having first and
12 second holes formed therethrough, said first hole aligned
13 with said first cavity and said second hole aligned with said
14 second cavity;

15 a first pin sized to loosely fit in said first hole and
16 at least a portion of said first cavity;

17 a second pin sized to loosely fit in said second hole
18 and at least a portion of said second cavity;

19 first means for positioning said first pin to reside
20 partially in said first hole and partially in said first
21 cavity; and

22 second means for positioning said second pin to reside
23 partially in said second hole and partially in said second
24 cavity wherein said brake pad is coupled to said housing by

25 said first and second pins, and

26 wherein, when a launch pressure is generated in the
27 launch tube, said launch pressure acts on said first pin via
28 said first hole and said second pin via said second hole,
29 wherein said first means and said second means fail whereby
30 said first pin and said second pin are driven out of
31 engagement with said brake pad so that said brake pad is
32 uncoupled from said housing.

1 10. A brake assembly as in claim 9 wherein said brake pad is
2 shaped for complementary cooperation with an interior portion
3 of the launch tube.

1 11. A brake assembly as in claim 9 wherein said brake pad is
2 made from a malleable material.

1 12. A brake assembly as in claim 9 wherein each of said
2 first and second cavities has a decreased diameter portion,
3 one end of which prevents further movement of a respective
4 one of said first and second pins after they are driven out
5 of engagement with said brake pad.

1 13. A brake assembly as in claim 12 wherein each of said
2 first and second pins has a counter bore formed therein at

3 one end thereof that encounters said one end of said
4 decreased diameter portion.

1 14. A brake assembly as in claim 9 wherein, prior to
2 generation of said launch pressure,

3 said first means comprises a first wire passing through
4 said housing and said first pin, and a first screw threaded
5 into said first pin for applying pressure to said first wire,
6 and

7 said second means comprises a second wire passing
8 through said housing and said second pin, and a second screw
9 threaded into said second pin for applying pressure to said
10 second wire.

1 15. A brake assembly as in claim 9 further comprising
2 channels formed in said brake pad for directing said launch
3 pressure into each of said first and second holes.

1 16. A brake assembly as in claim 9 further comprising a
2 lubricant disposed (i) about said first pin and said second
3 pin, and (ii) between said brake pad and said housing.

1 17. A pressure-released brake assembly for restraining a
2 projectile in a launch tube prior to launch and for
3 automatically releasing the projectile at launch, said brake
4 assembly comprising:

5 a housing configured for fixed attachment to the side a
6 projectile, said housing defining first and second cavities
7 therein that lie in a cross-sectional plane of the launch
8 tube, each of said first and second cavities having a
9 longitudinal axis that extends substantially radially out
10 from the projectile when said housing is attached thereto
11 wherein said first and second cavities are angled towards one
12 another, each of said first and second cavities defined by a
13 large diameter portion and a decreased diameter portion
14 adjoining said large diameter portion;

15 a brake pad adjoining said housing and having first and
16 second holes formed therethrough, said first hole aligned
17 with said large diameter portion of said first cavity and
18 said second hole aligned with said large diameter portion of
19 said second cavity;

20 a first pin sized to loosely fit in said first hole and
21 said large diameter portion of said first cavity, said first
22 pin having a diameter that is larger than said decreased
23 diameter portion of said first cavity;

24 a second pin sized to loosely fit in said second hole

25 and said large diameter portion of said second cavity, said
26 second pin having a diameter that is larger than said
27 decreased diameter portion of said second cavity;

28 first means for positioning said first pin to reside
29 partially in said first hole and partially in said large
30 diameter portion of said first cavity; and

31 second means for positioning said second pin to reside
32 partially in said second hole and partially in said large
33 diameter portion of said second cavity wherein said brake pad
34 is coupled to said housing by said first and second pins, and

35 wherein, when a launch pressure is generated in the
36 launch tube, said launch pressure acts on said first pin via
37 said first hole and said second pin via said second hole,
38 wherein said first means and said second means fail due to
39 said launch pressure whereby said first pin and said second
40 pin are driven out of engagement with said brake pad so that
41 said brake pad is uncoupled from said housing.

1 18. A brake assembly as in claim 17 wherein said brake pad
2 is shaped for complementary cooperation with an interior
3 portion of the launch tube.

1 19. A brake assembly as in claim 17 wherein said brake pad
2 is made from a malleable material.

1 20. A brake assembly as in claim 17 wherein each of said
2 first and second pins has a counter bore formed therein at
3 one end thereof that faces said decreased diameter portion of
4 said first and second cavities, respectively.

1 21. A brake assembly as in claim 17 wherein, prior to
2 generation of said launch pressure,

3 said first means comprises a first wire passing through
4 said housing and said first pin, and a first screw threaded
5 into said first pin for applying pressure to said first wire,
6 and

7 said second means comprises a second wire passing
8 through said housing and said second pin, and a second screw
9 threaded into said second pin for applying pressure to said
10 second wire.

1 22. A brake assembly as in claim 17 further comprising
2 channels formed in said brake pad for directing said launch
3 pressure into each of said first and second holes.

1 23. A brake assembly as in claim 17 further comprising a
2 lubricant disposed (i) about said first pin and said second
3 pin, and (ii) between said brake pad and said housing.